

A Comparative Study of Visual Reaction Time for Red and Green Colors in Medical Students

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Abstract

Background: RT (Reaction time) is the interval time between the presentation of a stimulus and the initiation of the muscular response to that stimulus. Aim of the study was to compare visual reaction time for Red and Green colors in the first year medical students. **Material & Methods:** Total 120 first year M.B.B.S students in age group of 17-24 yrs both male and females were selected. Visual Reaction time was recorded by using audiovisual Reaction time apparatus designed by Anand agencies Pune. The study was carried out in the research lab, Department Of Physiology, Vikhe Patil Medical College, between 3 to 5 pm. **Result:** Data was analyzed by unpaired "t" test we found that visual Reaction time for Red and Green colors were statistically significant both in male and female ($p < 0.05$) visual reaction time for red color light is faster than green color light both in males and females. **Conclusion:** Thus our study results showed visual reaction time for green color was significantly more than red color. This could be because individual color mental processing time for green color is more than red color

Keywords: Green Color; Red Color; Reaction Time; Visual Reaction Time; RT: Reaction Time; VRT: Visual Reaction Time.

Introduction

RT (Reaction time) is the interval time between the presentation of a stimulus and the initiation of the muscular response to that stimulus [1,2]. Human body has a tendency to produce responses for number of external environmental stimuli of different modalities. There is definite time period between application of stimulus and proper motor response. human body gives different responses to different sensory modalities at different speed. This plays essential role in day to day life as well as in emergency survival as while driving it is required to put break as fast as possible to vehicle when required. RT in response to a condition can remarkably effect our lives due to its practical implications. Fast RT can produce rewards (e.g. in sports) whereas slow RT can produce grave consequences (e.g. driving and road safety matters) [3,4].

Many factors have been exhibited to affect reaction time including gender, age, physical fitness, level of fatigue, distraction, alcohol, different colors, personality type, limb used for test, biological rhythm, and health and whether the stimulus is auditory or

visual. Prolonged reaction time denotes decreased performance [4].

Reaction time is having mainly two components : (1) Premotor time - which is time required for receiver to perceive stimulus, identifying and analyzing of stimulus, and decide the proper motor response (2). Motor time - it is time required to perform movement after selection of response [3].

There are three types of reaction time [3]. (1) Simple reaction time - reaction time from a task in which a single known response is produced when a single stimulus is presented (2) Recognition reaction time - here there are some stimulus that should be responded to and other that should not get response (3) Choice reaction time - reaction time for a task in which each response to be made is associated with a different stimulus.

The wave length and energy of each color varies with the intensity and this in turn affects human body in different ways. Several studies have been assumed to examine the influence of color on the simple reaction time. In few studies, reaction time has been revealed to be independent of wavelength while others have found that reaction time to red

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stimuli was less than that to green or blue stimuli [4]. The present study was under taken to confirm these findings.

Thus, this study was carried out to scientifically grant to the field of RT.

Aims and Objectives

To compare visual reaction time for red and green colors in the first year medical students.

Materials and Methods

After obtaining approval from research and ethical committees, DVVVPF's medical college a total 120 first year medical students of 2016 batch were selected and written informed consent were taken from all the participants.

The study was conducted in the research lab, Department Of Physiology, vikhe Patil Medical College, between 3 to 5 pm.

Inclusion Criteria

120 healthy medical students in age group of 17-24 yrs both male and females.

Exclusion Criteria

1. History of smoking, alcoholism
2. Those having any history of visual disorders,
3. History of any medications affecting cognitive performance will be excluded from study.
4. Those having any major illness in the present or past,
5. History of color blindness

Visual Reaction time was recorded by using audiovisual Reaction time apparatus designed by Anand agencies Pune. It works on 230 volts AC. The instrument is specially designed to measure reaction time in seconds [5].

All the participants were completely familiarized with the apparatus. All tests were done in quite room at normal room temperature.

Visual reaction time-The visual stimulus was provided in the form of green and red color light. Red and green color light visual stimulus was given separately. Subject was asked to press response switch as soon as the red or green color light blinks. 3 readings were taken; an average of 3 readings was taken as subject's best reading.

The data was statistically analyzed by using student unpaired t test.

Table 1: Comparison of visual reaction time for red and green colours in all participants in seconds

Colour	Number	Mean \pm SD	'p' value
Red	120	0.186 \pm 0.033	0.000**
Green		0.198 \pm 0.034	

*p<0.05 statistically significant **p<0.001 statistically highly significant

Table 1 show that visual reaction time for red color light (0.186 \pm 0.033) was significantly faster than in green color (0.198 \pm 0.034) in all participants

Table 2: Comparison of visual reaction time for red and green colours in seconds in females

Sex	Number	Colour	Mean \pm SD	'p' value
Females	60	Red	0.190 \pm 0.028	0.003*
		Green	0.202 \pm 0.032	

*p<0.05 statistically significant **p<0.001 statistically highly significant

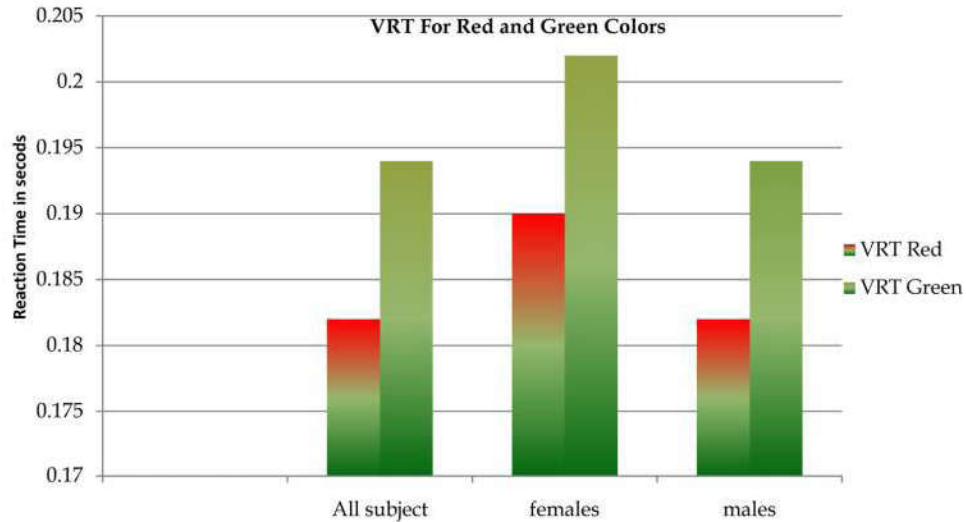
Table 2 show that visual reaction time for red color light was significantly faster (0.190 \pm 0.028) than in green color light (0.202 \pm 0.032) in females

Table 3: Comparison of visual reaction time for red and green colors in seconds in males

Sex	Number	Colour	Mean \pm SD	'p' value
Males	60	Red	0.182 \pm 0.037	0.002*
		Green	0.194 \pm 0.036	

*p<0.05 statistically significant **p<0.001 statistically highly significant

Table 3 show that visual reaction time for red color light was significantly faster (0.182 \pm 0.037) than in green color light (0.194 \pm 0.036) in males



Graph 1: Comparison of VRT for Red and Green colour lights in all participants, females and males

Graph 1: showing faster VRT for Red colour light as compared to Green colour light in all participants, females and males

Discussion

Reaction time is based on several factors like approach of the stimulus at the sensory organ, conversion of the stimulus by the sensory organ to a neural signal, neural transmissions and processing, muscular activation, soft tissue compliance, and the selection of an external measurement parameter [6]. The present study was aimed to compare visual reaction time for red and green colors in 1st year M.B.B.S medical students.

We compared visual reaction time for red and green color stimuli in all participants, 60 male and 60 female medical students. In our study we observed that Visual reaction time for Red and Green colors were statistically significant both in male and female. Table 1, Table 2 and Table 3, Graph 1, shows visual reaction time for red color light is faster than green color light both in males and females.

Few other studies also shown same finding that is Visual Reaction time to red light is faster was compared to the green light in both males and females [7,8].

This can be described on the basis of the Trichromatic Theory of color vision. when Tomita and Co-workers illuminated the retina with micro-electrode penetration of a single cones, They found that 74% of units peaked in the red spectrum, 10% in the green spectrum and 16% in blue spectrum [9].

Conclusion

Thus our study results showed visual reaction time for green color was significantly more than red color. This could be because individual color mental processing time for green color is more than red color.

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Abbreviations

RT- Reaction Time

VRT- Visual Reaction Time

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